Use of Planning Worksheets

Cheryl Dorsey
digitalflight@erols.com

Presentation Overview

- What are the worksheets ?
- How to use the worksheets
- Why use worksheets ?
- Benefits

What are the Worksheets?

- A means and method of documenting the DO-178B process based on a set of plans
- A tool to develop plans that meet DO-178B
- A tool to assess internal and external consistency of a set of plans
- A tool to determine if all the applicable DO-178B objectives are part of the process

Worksheet 1
Data Summary

Provides a means to record the documents' names and version numbers used for a review.

Document #	Version	Date	Title	Notes

Objective of Worksheet 2

Worksheet 2 - Development Lifecycle provides a comprehensive way to determine the lifecycle processes, activities and data.

Worksheet 2
Development Lifecycle

Lifecycle Phase: (need one for each life cycle process or phase)

Inputs	Activities	Outputs	Transitions

CM Activities	Verification Activities	QA Activities

Notes

Worksheet 3
Lifecycle Environment

Worksheet 3 - Lifecycle Environment provides a means to record the proposed lifecycle environment . Can be used later in SOI 2 and SOI 3 review to see if this is in fact the environment used.

ENVIRONMENT	Development	Verification	Target
Computer			
Operating System			
Language			
Compiler			
Linker			
Loader			
Libraries			
Emulator			
(Enter **Name and Version or N/A if Not Applicable or Same if same as Previous Column)**			

Worksheet 3
Lifecycle Environment

TOOLS	Development	Verification	Target
Configuration Mgmt			
Requirements Mgmt			
Design/Code			
Verification			

(Enter **Name and Version or N/A if Not Applicable or Same if same as Previous Column)**

Worksheet 4 Configuration Management

SCM Process Objective	DO-178B Reference	CC1	CC2	Plan Reference (Document, Section, Line)	Notes
Configuration Identification	7.2.1	●			
Baselines	7.2.2a, b, c, d, e	●			
Traceability	7.2.2f, g	●	●		
Problem Reporting	7.2.3	●			
Change Control - Integrity and identification	7.2.4a, b	●	●		
Change Control - Tracking	7.2.4c, d, e	●			
Change Review	7.2.5	●			
Configuration Status Accounting	7.2.6	●			
Retrieval	7.2.7a	●	●		
Protection Against Unauthorized Changes	7.2.7b(1)	●	●		
Media Selection, Refreshing, Duplication	7.2.7b(2), (3), (4), c	●			
Release	7.2.7d	●			
Data Retention	7.2.7e	●	●		

Worksheet 5
Additional Considerations

Capture all dialogue and agreements on this worksheet. In the cases where additional considerations are accompanied by existing policy, that policy should be referenced and conveyed to applicant.

Additional Considerations	Applicable (Y/N)	Plan Reference (Document, Section, Line)	Notes
Previously Developed Software			
Modified Previously Developed Software			
Alternative Means of Compliance			
Product Service History			
Tool Qualification			
Option Selectable Software			
User Modifiable Software			
COTS Usage			
Field Loadable			
OOTIA			
Other			

Worksheets 6a & 6b
Forward and Backward Trace

Software Requirement (Req ID)	Design Requirement (Req ID)	Code (module/line #)	Test Procedures (Test IDs)	Forward Trace OK (Y/N)	Notes

Code (module/line #))	Design Requirement (Req ID)	Software Requirement (Req ID)	System Requirement (Req ID)	Forward Trace OK (Y/N)	Notes

Worksheet 7
Review Questions

Plan Reference (Document, Section, Line)	Significant (Y/N)	Question	Notes

Worksheet 8
Findings and Observations

Replace with Job Aid

Worksheet 9
Tool Qualification

Tool Qualification is the list of development and verification tools with a note as to whether they need to be qualified or not. For all tools that do not need qualification, state why they do not need qualification.

Tool Name	D/V	Qualified (Y/N) (If No, Reason Why Not)	Comments/Notes

Worksheets
Table A1 through Table A-9

Document on Table A1 through Table A-9 worksheets exactly where in the plans each objective is covered by an activity.

Are all the DO-178B objectives covered in the plans? If not, the plans as written will not assure compliance to DO-178B.

These worksheets can be used as a quick reference (pointers into the plans) for subsequent SOI reviews.

Worksheet Table A-1

	Objective		Applicability By SW Level				Output		Control Category				Results	
	Description	Ref.	A	B	C	D	Description	Ref.	A	B	C	D	Satisfied (Yes/No)	Evidence (Data, Page, etc)
1	Software Development and Integral Processes activities are defined.	4.1a 4.3	❍	❍	❍	❍	Plan for SW Aspects of Certification SW Development Plan SW Verification Plan SCM Plan SQA Plan	11.1 11.2 11.3 11.4 11.5	(1) (1) (1) (1) (1)	(1) (1) (1) (1) (1)	(1) (2) (2) (2) (2)	(1) (2) (2) (2) (2)		
2	Transition criteria, inter-relationships and sequencing among processes are defined	4.1b 4.3	❍	❍	❍									
3	Software life cycle environment is defined.	4.1c	❍	❍	❍									
4	Additional considerations are addressed.	4.1d	❍	❍	❍	❍								
5	Software development standards are defined.	4.1e	❍	❍	❍		SW Requirements Specification SW Design Standards SW Code Standards	11.6 11.7 11.8	(1) (1) (1)	(1) (1) (1)	(2) (2) (2)			
6	Software plans comply with this document.	4.1f	❍	❍	❍		SQA Records SW Verification Results	11.19 11.14	(2) (2)	(2) (2)	(2) (2)			
7	Software plans are coordinated.	4.6	❍	❍	❍		SQA Records SW Verification Results	11.19 11.14	(2) (2)	(2) (2)	(2) (2)			

Worksheet Table A-3

	Objective		Applicability				Output		Control Category				Results	
	Description	Ref.	A	B	C	D	Description	Ref.	A	B	C	D	Satisfied Y/N	Evidence (Data, Page, etc)
1	Software high-level requirements comply with system requirements.	6.3.1a	●	●	❍	❍	Software Verification Results	11.14	(2)	(2)	(2)	(2)		
2	High-level requirements are accurate and consistent.	6.3.1b	●	●	❍	❍	Software Verification Results	11.14	(2)	(2)	(2)	(2)		
3	High-level requirements are compatible with target computer.	6.3.1c	❍	❍			Software Verification Results	11.14	(2)	(2)				
4	High-level requirements are verifiable.	6.3.1d	❍	❍	❍		Software Verification Results	11.14	(2)	(2)	(2)			
5	High-level requirements conform to standards.	6.3.1e	❍	❍	❍		Software Verification Results	11.14	(2)	(2)	(2)			
6	High-level requirements are traceable to system requirements.	6.3.1f	❍	❍	❍	❍	Software Verification Results	11.14	(2)	(2)	(2)	(2)		
7	Algorithms are accurate.	6.3.1g	●	●	❍		Software Verification Results	11.14	(2)	(2)	(2)			

Worksheet Table A-7

	Objective		Applicability By SW Level				Output		Control Category By SW Level				Results	
	Description	Ref.	A	B	C	D	Description	Ref.	A	B	C	D	Satisfied (Yes/No)	Evidence (Data, Page, etc)
1	Test Procedures are correct.	6.3.6b	●	❍	❍		Software Verification Cases and Procedures	11.13	(2)	(2)	(2)			
2	Test resutls are correct and discrepancies explained.	6.3.6c	●	❍	❍	❍	Software Verification Results	11.14	(2)	(2)	(2)			
3	Test coverage of high-level requirements is achieved.	6.4.4.1	●	❍	❍		Software Verification Results	11.14	(2)	(2)	(2)	(2)		
4	Test coverage of low-level requirements is achieved.	6.4.4.1	●	❍			Software Verification Results	11.14	(2)	(2)	(2)			
5	Test coverage of software structure (modified condition/decision) is achieved.	6.4.4.2	●				Software Verification Results	11.14	(2)					
6	Test coverage of software structure (decision coverage) is achieved.	6.4.4.2a 6.4.4.2b	●	●			Software Verification Results	11.14	(2)	(2)				
7	Test coverage of software structure (statement coverage) is achieved.	6.4.4.2a 6.4.4.2b	●	●	❍		Software Verification Results	11.14	(2)	(2)	(2)			
8	Test coverage of software structure (data coupling and control coupling) is achieved.	6.4.4.2c	●	●	❍		Software Verification Results	11.14	(2)	(2)	(2)			

How to Use the Worksheets

While reviewing each plan, fill in the worksheets with the information provided in the plans.

When all plans are reviewed, look for inconsistencies in the worksheets, missing data and activities/objectives.

Determine if each process (development and integral) has clearly defined activities during each lifecycle process/phase.

Benefits

Provides a means to assure that the plans, if followed, will provide the requisite data and quality required by DO-178B.

Enables review of processes across plans by lifecycle model.

Can be used on subsequent SOI reviews -- no need to re-review plans prior to subsequent SOI reviews.

Provides information required to answer many Job Aid Questions.